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## Effects of overseas subsidiaries on worldwide corporate taxes



Namryoung Lee<sup>a</sup>, Charles Swenson<sup>b,\*</sup>

<sup>a</sup> Korea Aerospace University, Goyang, Republic of Korea

<sup>b</sup> Marshall School of Business, University of Southern California, Los Angeles, CA, United States

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### ABSTRACT

We propose and test a simple model of international tax shifting, which shows that multinational firms' abilities to engage in tax arbitrage are functions of the benefits and costs of doing so. We use a large database of publicly traded firms of over 200 countries and hand-collect tax rates for all subsidiaries for such firms. We find that firms' effective tax rates are lower if the countries in which they operate vary significantly in their statutory rates and that firms' effective rates are higher the more countries they operate in and the more subsidiaries they have.

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## 1. Introduction

Recent empirical evidence<sup>1</sup> has documented that effective corporate income tax rates vary enormously by firm and country and that such rates are declining over time. This evidence suggests that firms manage their tax burdens, perhaps by exploiting within-country favorable tax rates and rules or by shifting income between countries. Income shifting is profitable when statutory rates differ between the countries in which firms operate. However, shifting is neither straightforward nor costless, since most firms have numerous subsidiaries operating in various combinations of countries, each with differing tax rates.

To illuminate the complexities of tax shifting, we propose a simple model, which predicts that firms' abilities to engage in international tax arbitrage are functions of the benefits and costs of doing so. We then test the model's predictions by examining effective tax rates (ETRs) for all publicly traded companies over a four-year period (2005–2008) reported in the Osiris electronic database produced by Bureau van Dyk. To develop ETRs, we hand-collect statutory tax rates for the 200 countries in which these 552,000 firms and their over one million subsidiaries operated. Consistent with our model, we find that firms' effective tax rates are lower if the countries they operate in have high variability in statutory rates. We also find that tax shifting is lower (*ceteris paribus*) for firms with larger global spans, that is, those operating in more countries with more subsidiaries. This paper contributes to the literature by being the first to examine the impact of tax rates for all jurisdictions in which a particular firm operates and to then model and test the impacts of such rates on effective tax rates. We conclude that tax shifting happens worldwide and is not restricted to firms based in developed countries.

\* Corresponding author. Tel.: +1 213 740 4854; fax: +1 2137472815.

E-mail address: [cswenson@marshall.usc.edu](mailto:cswenson@marshall.usc.edu) (C. Swenson).

<sup>1</sup> See for example Lee and Swenson (2008) and Loretz and Moore (2012).

## 2. Prior research

Some research has examined ETRs, but none has decomposed them to the level done here, nor examined shifting across a worldwide sample of firms. In addition, few studies have attempted to measure the impact of tax arbitrage (tax shifting). The growing body of evidence on tax shifting, comprehensively analyzed by Heckemeyer and Overesch (2012), indicates that multinationals do minimize their tax obligations by shifting profits from high to low tax jurisdictions. Prior studies typically show that pre-tax profitability of affiliates is decreasing in a jurisdiction's tax rate or tax differential with economies hosting other firms in the same multinational group. These studies focus on profit shifting by R&D-based intangibles (Grubert, 1998), the ease of locating intangibles in low-tax subsidiary jurisdictions (Dischinger & Riedel, 2011), the ownership structure of subsidiaries (Weichenrieder, 2009), and the location of parent companies (Dischinger & Riedel, 2010). Other studies examine whether the absence of transfer pricing regulations<sup>2</sup> or lax enforcement of the arms' length principle for related-party transactions is likely to be associated with aggressive profit shifting (Bartelsman & Beetsma, 2003; Beuselinck, Deloof, & Vanstraelen, 2009; Lohse & Riedel, 2012). Dyreng and Lindsey (2009) focus on the effect of tax havens on the worldwide tax charges of US multinationals and find that it is small<sup>3</sup>. Huizinga and Laeven (2008) use subsidiary data for European Union-firms to examine the amount of taxable income shifted between countries to lower firms' tax burdens. However, as their analysis was restricted to EU companies, their primary finding was that sample companies shifted tax burdens away from Germany.

Most recently, Loretz and Moore (2012) examine international tax competition between firms. They first model the incentives for firms in the same industry and similar geographic markets to avoid reputation loss by benchmarking their ETRs to those of competitors. Empirically, they find that the positive spatial interdependence between firm ETRs is significant between firms in the same country. Their evidence holds for companies in the OECD, the European Union, and certain other countries.

In one of the few studies to consider subsidiary effects, Markle and Shackelford (2012) examine average effective tax rates for firms from 86 countries from 1988 to 2007. They find that such rates were lowest for firms headquartered in the Middle East and tax haven countries and highest in Japan. They also find that effective rates were much lower than statutory rates and that effective rates declined steadily over time. They restricted their examination of subsidiary effects to regressing ETRs on dummy variables for each country in which a firm had a subsidiary. They found ETRs were affected differently depending on countries in which a firm had such subs.

Our study reaches beyond Markle and Shackelford (2012) by explicitly considering statutory rates of all countries in which firms operate and by providing a model of how such rates (as well as the span of subsidiary operations) affect ETRs. We extend research by Huizinga and Laeven (2008) and Bartelsman and Beetsma (2003) by examining firms from a worldwide database.

## 3. Model and predictions

To more clearly examine the potential effects of tax shifting, we propose a simple model of a multinational firm where there is a difference in statutory rates between the firm's home country and those of the other countries in which it operates. Consider a multinational that operates in home country  $i$  and foreign country  $j$ . It can avail itself of a vector of international tax management techniques to maximize after-tax income. Its total tax bill (and therefore effective tax rate) is reduced by relatively lower statutory tax rates in either or both countries, whether or not shifting occurs. While this prediction that statutory rates matters seems obvious, note that prior research has examined the effects of multinationals' tax rates using only the tax rate of firms' home countries of the parent company; no scholars have explicitly considered the effects of statutory rates in all of the countries in which firms operate. Our model suggests the rates in countries subsidiaries operate in turn out to be almost as important as parent country rates.

Next, consider tax management through shifting. Assume that pretax income is measured by the same rules in both countries. The firm then decides to allocate pretax income across the two countries based on tax rates, to maximize after-tax profits. Assume that the marginal cost of shifting income increases as the amount of income shifted increases<sup>4</sup>. We have the following model:

$$\text{Max } \Pi = \lambda(1 - \tau_i)\pi_i + (1 - \lambda)(1 - \tau_j)\pi_j - c_i\lambda^k\pi_i - c_j(1 - \lambda^k)\pi_j \quad (1)$$

<sup>2</sup> Several studies using U.S. data (see survey reported in Newlon, 2000) generally find evidence of profit shifting consistent with transfer pricing for U.S.-based firms.

<sup>3</sup> Earlier multinational ETR studies include those of Nichodeme (2001), who uses firm-level data to estimate ETRs for EU, Japanese, and U.S. companies from 1990 to 1999. Altshuler, Grubert, and Newlon (2001) use IRS tax return data to estimate effective rates which U.S. multinationals faced while operating abroad from 1984 through 1992. Bretschger and Hettich (2001) examine data from 1967 to 1996 for 14 OECD countries and find that globalization reduced taxes as opportunities for multinational tax planning (e.g., transfer pricing) increased. Slemrod (2004) uses macro data and finds there is a declining dispersion of average effective rates across countries over time. Rego (2003) finds that U.S. multinationals with more extensive foreign operations have lower worldwide ETRs than do other firms.

<sup>4</sup> Costs may increase if increasing shifting results in the likelihood of audit increasing, increasing planning costs, and potential nontax structuring (i.e., setting of pre-tax transfer prices), etc.

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